CREATING DOCUMENTATION

BY RSMITH28

The purpose of this document is to guide the reader through authoring and illustrating documentation comparable to the Urutau. This document assumes you have the technical knowledge to design something worth authoring, illustrating, and publishing documentation for. Therefore, I trust that you are technically competent and capable of researching any subject(s) this document covers that you are not familiar with.

By no means do I consider myself an expert in technical writing or illustration. I simply want to share what worked for the Urutau. Because I do something a certain way does not make it the only way. Constructive criticism and alternative ideas are always encouraged and appreciated!

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Due to the non-linear process of creating documentation, some of this document's sections are instructional while others provide generic advice. I suggest reading through this entire document at least once before starting to write documentation of your own.

GETTING STARTED

Documentation… It is the part a project nobody wants to think about. Writing documentation for a project related to privately manufacturable firearms is similar to what you experienced when you were a child in science class. From time to time, you got to participate in a fun in-class experiment, but no matter how fun it was, you always needed to write a stupidly dry lab report afterwords.

To be completely honest, the dryness of writing documentation is unavoidable. It is not unmanageable, however. You can make the process more tolerable by asking for feedback periodically, taking breaks when appropriate, and picking out a good album or playlist to listen to when working. (The Oppenheimer soundtrack, Two Steps From Hell, and other classical music got me through the Urutau documentation, for example.)

No matter how you choose to manage the monotony of writing and illustrating documentation, the best thing you can do is to avoid making it harder than it needs to be. Speaking from experience, **the first thing you need to consider is the completeness of the project that you are creating documentation for**. If the design is subject to changes as you are writing and illustrating, you risk wasting a lot of your effort.

However, even if your team is still working on a project, there are three things you can do to get an early start: **outlining**, **boilerplate writing**, and **supplementary writing**.

Outlining is the act of creating a dynamic list which breaks your documentation down into digestible sections. I recommend breaking down the documentation by topic changes, big milestones, and sections that may or may not apply to everyone. In other words, you are creating a preview for what will become your table of contents and, potentially, a collection of separate documents. While this may seem frivolous, I can assure you that it is easier to organize your thoughts now rather than for you to have to reorganize completed pages and sections later.

Boilerplate writing is the act of authoring certain sections of the documentation that are required to complete a project. This information is usually generic and not likely to change, even if your project is still under development. Examples include a title page, attributions, legal warnings, safety warnings, or a glossary. This information is usually uncomplicated, but you may save time by completing it proactively.

Supplementary writing is the act of authoring sections of the documentation that are informative, entertaining, or serve some other supplementary purpose, but are not

required to complete a project. These sections generally take a lower priority than others, but to use your time efficiently, I recommend working on these if you have nothing else to do. In the Urutau's documentation, examples include The New Second Amendment, an inspirational document, Opsec & Obfuscation, advice for those in legally precarious circumstances, Technical Aspects and Design Choices, an explanation of the Urutau's unique features, and Electrochemical Machining Fundamentals and Parts of a Barrel, contextual information on the ECM process.

FONT CHOICES

For the Urutau, I prepared the documentation in LibreOffice Writer. I chose this program because its developers follow free & open source software (FOSS) standards, and it is compatible with most GNU+Linux distributions. Also, simply put, it is a program I am familiar with and that I can utilize well for the project at hand. While you are welcome to use any word processor you like, this document is going to cover my preferred use of LibreOffice Writer.

When starting a new LibreOffice Writer document, the first thing you want to consider is your styling. Specifically, what kind of font preferences do you have for your paragraphs, headers, and sub-headers? Personally, I prefer to use the font Liberation Sans Narrow at a 16 point size, and you are looking at it right now. Liberation Sans Narrow comes with LibreOffice for free. I think the font is easy on the eyes, and I think that it inspires focus and attention. (I know that may sound like a pretentious load of crap, but that is just my opinion.)

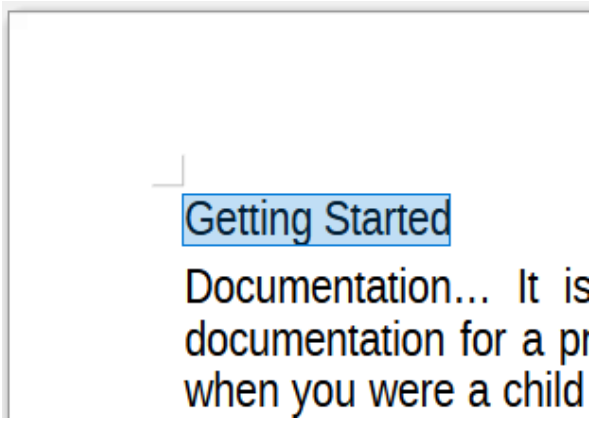
For my paragraphs, I also like to use justified alignment. This is how paragraphs will automatically reach both sides of the page and form straight, uniform margins on both sides. That is what the depicted button does.

For my headers and sub-headers, I prefer to use the font Bebas Neue at varying sizes, usually 36 point and 24 point, respectively. As an example, look at the "Font Choices" section header above. Bebas Neue is available for free from Dafont.com. It is the font that JStark1809 and IvanTheTroll used on the FGC-9 cover page, and it appeared in a lot of early Deterrence Dispensed propaganda materials. While I would avoid using this font for any complete sentences or paragraphs, I think it is bold and attention-grabbing for any words that serve as titles in some capacity.

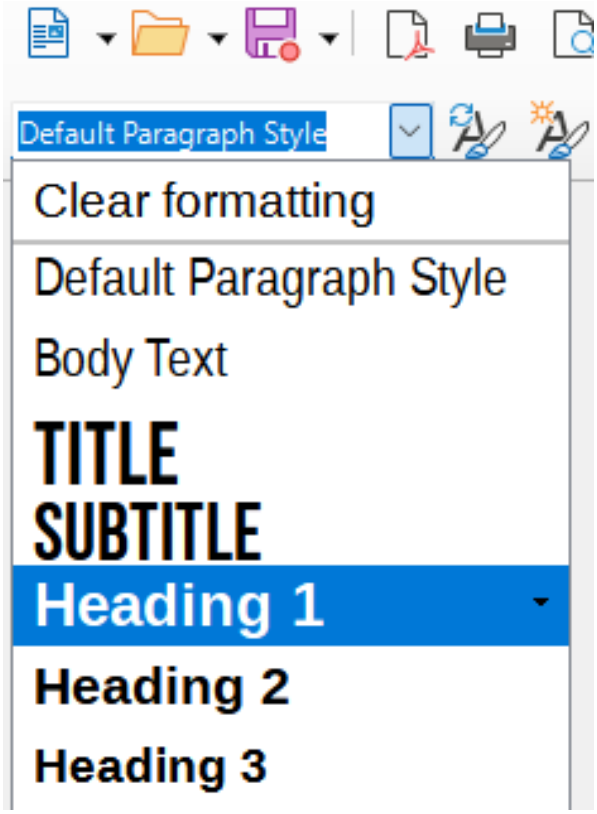
CONFIGURING STYLES

Once you have your font choices established, you are going to want to configure your styles in LibreOffice Writer. This may sound unnecessary, but it is helpful for organizing your document and automatically creating your table of contents.

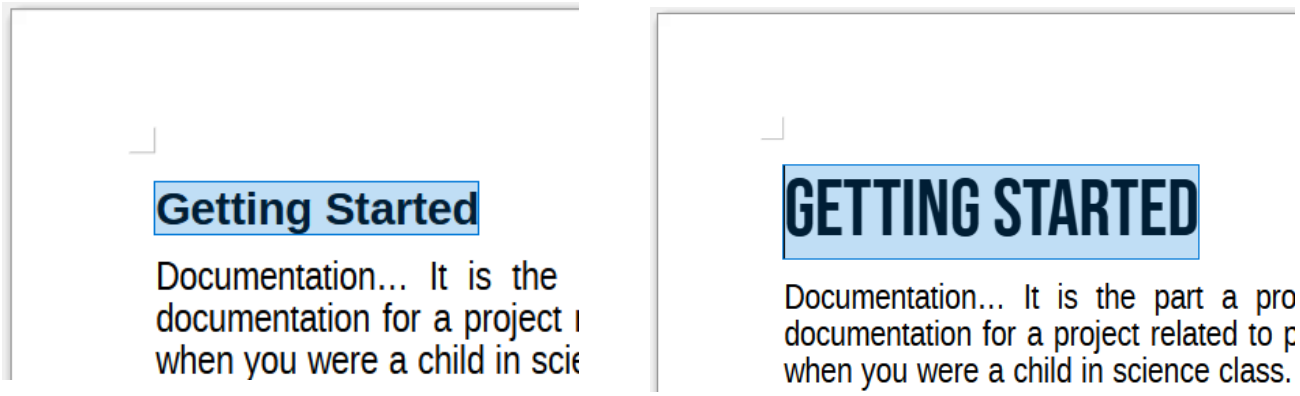
1. On a line separate from the other paragraphs on a page, enter the heading (section title) you want to apply to a section. Highlight the text.



2. In the top left corner, you should see a dropdown menu that says “Default Paragraph Style.” Click on it and select “Heading 1”



3. The text will reformat itself in a way that you probably will not like. Change the font and formatting into your preferred style.


Getting Started
Documentation… It is the
documentation for a project
when you were a child in scie
GETTING STARTED
Documentation… It is the part a pro
documentation for a project related to p
when you were a child in science class.

4. Click the “Update Selected Style” button to the right of the style dropdown menu. This will cause LibreOffice Writer to utilize your desired font and formatting preferences every time you select the style.

5. If you will need to use sub-headers, please repeat this process for each level of sub-header as applicable. (An example of sub-header use is in the OpSec & Obfuscation section of the Urutau documentation. The three rules are their own subsections, each with their own sub-headers, and rule #2 had three subsections of its own, each with their own sub-headers.)

6. To create your table of contents, insert a new page where you want it to go, and make sure your cursor is on that page. Go to Insert → Table of Contents and Index → Table of Contents, Index or Bibliography. Adjust the preferences to your desire and click OK. The table of contents should automatically populate with each time you used a header.

   Note that any time you add, change, or remove your headers or any time you add or remove pages, your table of contents will not automatically update. To update your table of contents, right-click on the table of contents and click Update Table of Contents.

ADVICE ON INSTRUCTIONS

When it comes time to write the instructions directly associated with a privately manufacturable firearm, I would hope that actually writing the instructions is common sense for you. However, please take the following advice. Failure to do so will leave you very frustrated. There is an easy way and a hard way to learn this information. I took the hard way so you can choose the easy way.

1. When you are running out of space on a page, and you need to create a new page, do not hit the enter key repeatedly to do so. Use page breaks (CTRL+Enter). Page breaks are your best friend, and I will explain why.

   If you are a good writer, you will reread and refine your writing as you are working and after you are finished. If you use the enter key to create new pages, any time you make an edit that adds or subtracts a line, you will mess up the positioning of *all* of the instructions underneath the one you are editing. You may find this slightly inconvenient if your documentation is only a few pages long, but once you get into the double or triple digits, making this mistake will make you want to kill yourself.

   So, don't do that! If you don't have enough space on a page for the next step you need to write and illustrate, simply hit CTRL+Enter or click on the Insert dropdown menu and select Page Break. This way, in the future, if you need to make some major changes to a step, you will only need to restructure the instructions on the page you are working with, not the entire section or document.

2. Do not write the instructions as a wall of text and then illustrate them later. The practice of creating individual illustrations for each step doubles as an ongoing quality control measure. It is okay to create a rough outline to organize your thoughts, but I do not recommend spending considerable time writing an instruction until you have a graphic to go along with it. When you are writing and rereading instructions, it is easy to mistakenly hallucinate information, even if you are highly familiar with the subject. It is even easier to forget to write critical information that the reader needs to complete their project.

   When you create graphics from either photographs of real objects or computer-generated photographs, you will experience the assembly instruction firsthand. Therefore, I recommend writing instructions only as or after you create their associated graphics.

Tries to move one thing

Microsoft Word:

/u/Dyleon69 via Reddit

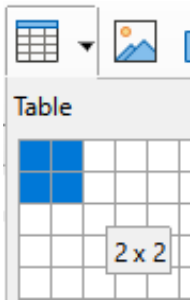
This is an example of "Optimal" wrapping.

3. Apply text wrapping to your illustrations and photos accordingly. Sometimes, you will want photographs or illustrations adjacent to or below your writing. LibreOffice Writer defaults to "Optimal" wrapping, which generally tries to space out text around the image accordingly. However, it does not always work very well, and it can make a mess after making slight changes to sizing and positioning.

   This will take some experimentation, but you may prefer using "None" wrapping, which will prevent text from appearing to the left or right of an image. You may instead prefer "In Background" wrapping, in which case you can adjust a paragraph's margins manually with the ruler above the workspace. To do that, select the paragraph you want to modify and drag the icon that looks like a house to the left. Again, this will take experimentation, but you will find something that works.

4. As you are working and after you think you are finished, please subject your work to peer review, including people who are familiar and unfamiliar with your project. For reasons already explained, it is easy to accidentally exclude important information. Pay close attention to anything any reviewer points out is unclear.

CREATING PART LISTS



1. For sections describing lists of machines, tools, materials, or 3D printed parts, you are going to want to use the table feature of LibreOffice Writer. To do this, click the Insert Table button at the top of the screen. I recommend starting with a 2X2 table, and you can add or remove cells if you need to.

2. If you would like to remove the borders on the table, right-click the table and then click Table Properties. Under the Borders tab, change the Line Style to None and click OK.

3. Drop a picture into one of the table cells. The cell will automatically conform to the size of the picture, but I recommend changing the wrapping to “In Background” and adjusting the height of the row manually. (Doing so makes future adjustments easier.)

4. Add a name and description to the cell adjacent to the image. This is a good place to provide contextual information and to discourage the builder from taking unwise shortcuts.

5. Repeat this process for each object you need to add to your list. Do not forget to use a page break and create a new table when you run out of space on a page.

URUTAU

Object

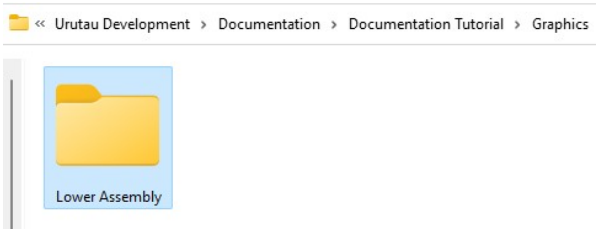
This is a description of the object. You may provide contextual information here as well. This object is mandatory/optional to…

CREATING LINE DRAWINGS

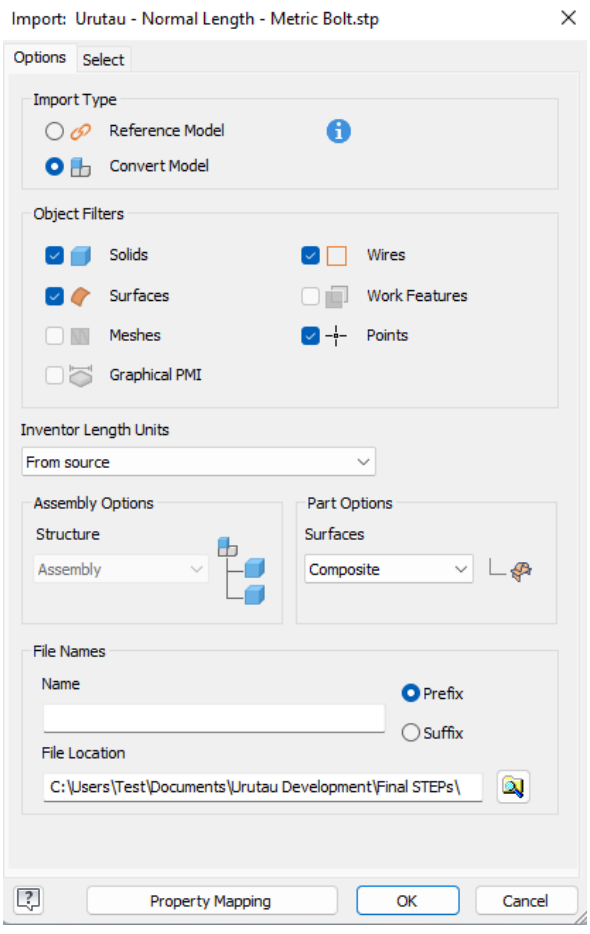
This section of the guide uses both Autodesk Inventor and Adobe Illustrator to create computer generated graphics to add to your documentation as required. For general use, neither of these programs are made available for free by their publishing companies, but do with that information what you will...

As an example, I will begin by explaining how I illustrated the step of the Urutau documentation where the disconnector is installed into the fire control group housing.

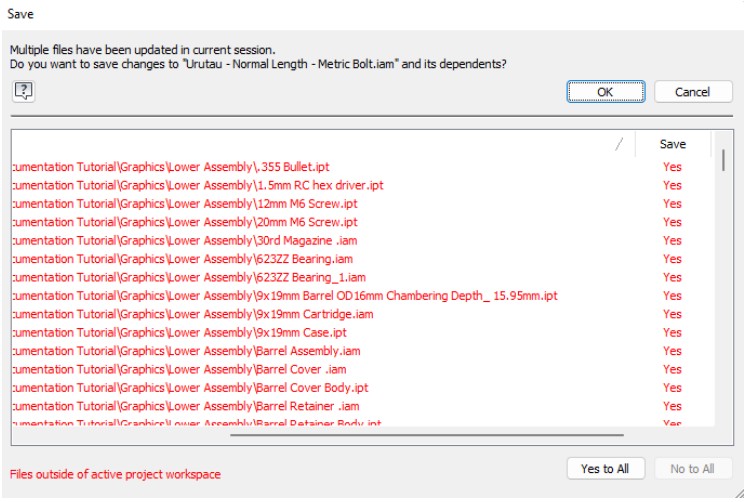
1. In file explorer, open your project directory. Create a graphics directory if you have not already. In that directory, create a directory for the section you are illustrating. (This process is going to create a lot of files, and you are going to want to keep them organized.) Copy a STEP assembly of your project into this directory.



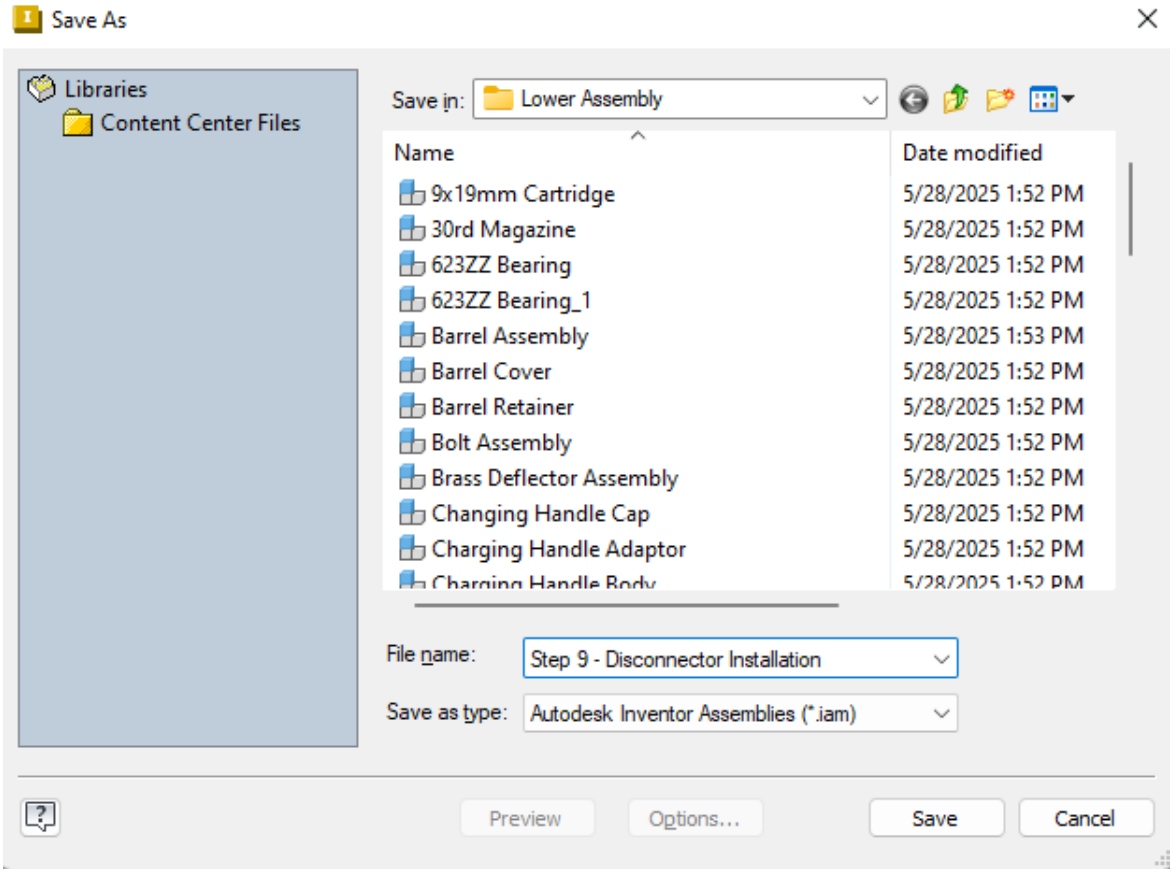
2. Open the STEP file in Autodesk Inventor. You will see this popup. Click OK. Depending on your computer's processing power and project's complexity, this may take a moment.



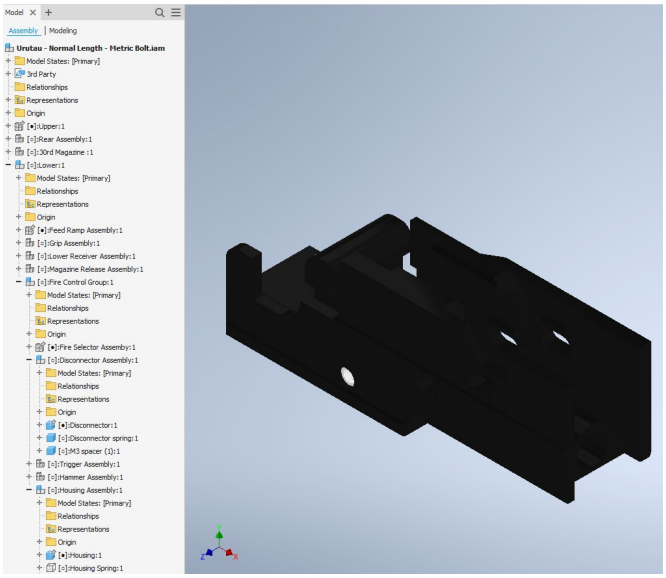
3. Once the assembly is open, go to File → Save (CTRL+S). You will see the depicted popup. Click OK. Depending on the complexity of your project, Inventor may appear unresponsive for a moment. Give it some time to process.

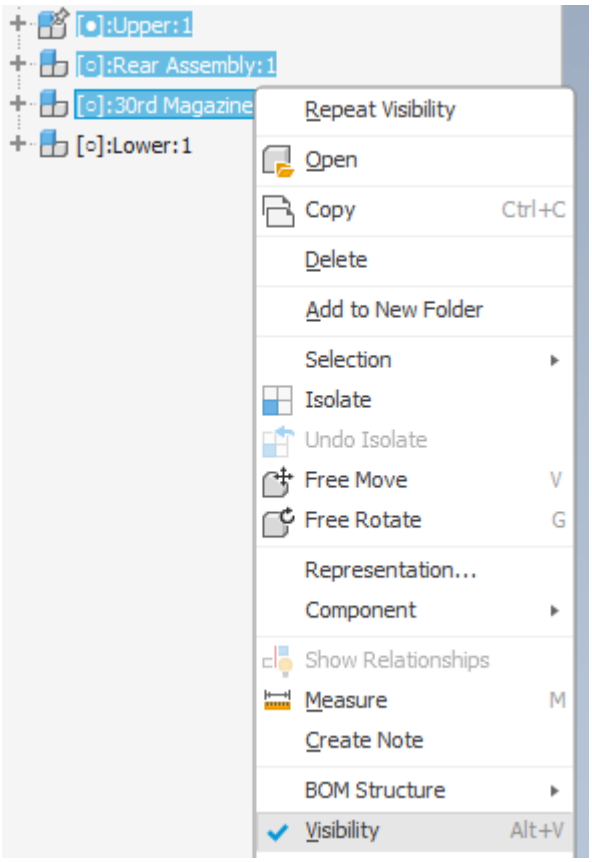

Save
Multiple files have been updated in current session.
Do you want to save changes to "Urutau - Normal Length - Metric Bolt.iam" and its dependents?
OK
Cancel
Save
umentation Tutorial\Graphics\Lower Assembly\.355 Bullet.ipt Yes
umentation Tutorial\Graphics\Lower Assembly\1.5mm RC hex driver.ipt Yes
umentation Tutorial\Graphics\Lower Assembly\12mm M6 Screw.ipt Yes
umentation Tutorial\Graphics\Lower Assembly\20mm M6 Screw.ipt Yes
umentation Tutorial\Graphics\Lower Assembly\30rd Magazine .iam Yes
umentation Tutorial\Graphics\Lower Assembly\623ZZ Bearing.iam Yes
umentation Tutorial\Graphics\Lower Assembly\623ZZ Bearing_1.iam Yes
umentation Tutorial\Graphics\Lower Assembly\9x19mm Barrel OD16mm Chambering Depth_ 15.95mm.ipt Yes
umentation Tutorial\Graphics\Lower Assembly\9x19mm Cartridge.iam Yes
umentation Tutorial\Graphics\Lower Assembly\9x19mm Case.ipt Yes
umentation Tutorial\Graphics\Lower Assembly\Barrel Assembly.iam Yes
umentation Tutorial\Graphics\Lower Assembly\Barrel Cover .iam Yes
umentation Tutorial\Graphics\Lower Assembly\Barrel Cover Body.ipt Yes
umentation Tutorial\Graphics\Lower Assembly\Barrel Retainer .iam Yes
Files outside of active project workspace
Yes to All
No to All

4. Now that we have a baseline assembly established, we are going to create our first graphic assembly. Before making any modifications to the assembly file you have open in Inventor, you will need to save another copy of the assembly. Go to File → Save As. I recommend titling the file “Step (# of step) - (quick description of step)”. An example would be “Step 9 - Disconnector Installation”. Choosing a name like this will make it easier to index the file if you need to make changes later. Click Save after you entered a name for the file.

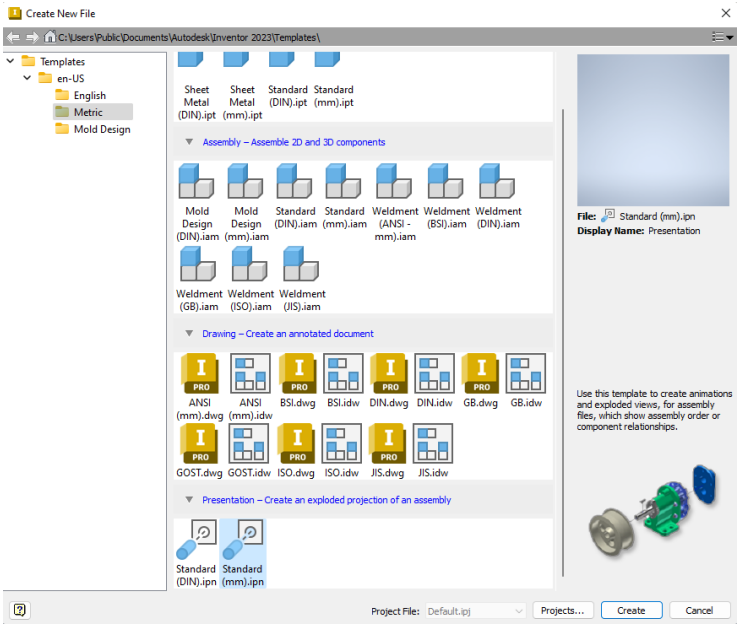

Save As
Libraries
Content Center Files
Save in: Lower Assembly
Name
Date modified
9x19mm Cartridge 5/28/2025 1:52 PM
30rd Magazine 5/28/2025 1:52 PM
623ZZ Bearing 5/28/2025 1:52 PM
623ZZ Bearing_1 5/28/2025 1:52 PM
Barrel Assembly 5/28/2025 1:53 PM
Barrel Cover 5/28/2025 1:52 PM
Barrel Retainer 5/28/2025 1:52 PM
Bolt Assembly 5/28/2025 1:52 PM
Brass Deflector Assembly 5/28/2025 1:52 PM
Changing Handle Cap 5/28/2025 1:52 PM
Charging Handle Adaptor 5/28/2025 1:52 PM
Charging Handle Body 5/28/2025 1:52 PM
File name: Step 9 - Disconnector Installation
Save as type: Autodesk Inventor Assemblies (*.iam)
Preview
Options...
Save
Cancel

5. Using the model window on the left, hide all of the sub-assemblies and parts that are not relevant. (Do not delete these parts. You will want them later.) Only the parts you want to include in your graphic should be visible. You can do this by selecting the part(s) you need to hide and pressing ALT+V on your keyboard. You can also do this by right-clicking an object and unchecking the Visibility option. If you see a popup about “Associative Design View Representation,” don’t worry about it and click OK. In the example, you can see that I isolated the assembly to the fire control group housing, the disconnector, the disconnector spacer, and the disconnector spring. Don’t forget to save your work.

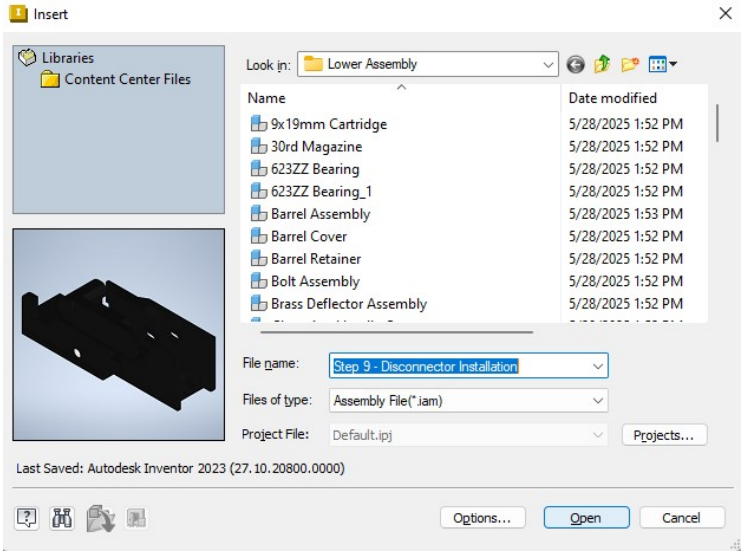




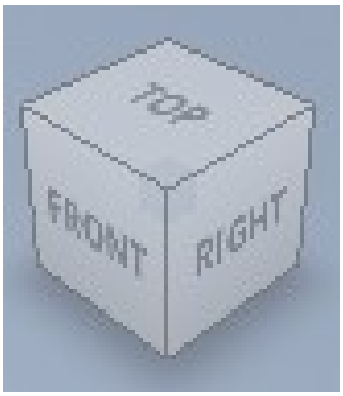
6. Go to File → New or press CTRL+N. Assuming you are working with metric-sized components, under the metric template folder, scroll down. Under the presentation section, select “Standard (mm).ipn” and then click Create.

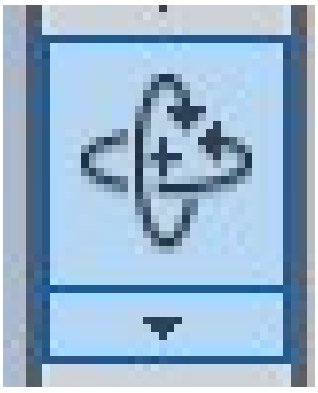


7. You will see a prompt to open an assembly file. It should default to the assembly file you just created. If it does not, select the assembly file. Click Open.

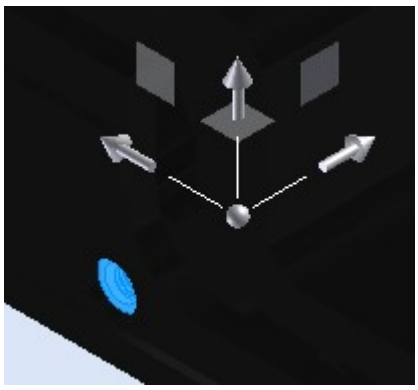


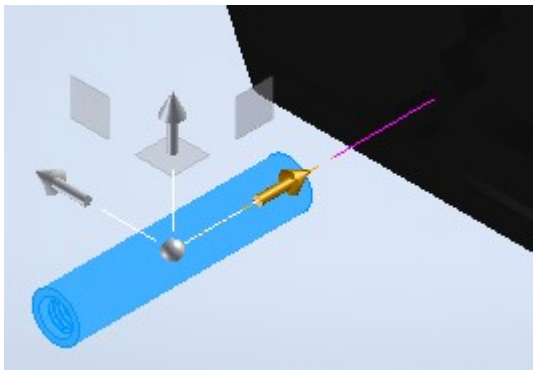
8. Use the cube in the top-left corner and/or the Free Orbit tool to orient the object as you see fit. At this point, what you see is what you get on the final graphic, so orient the assembly accordingly.





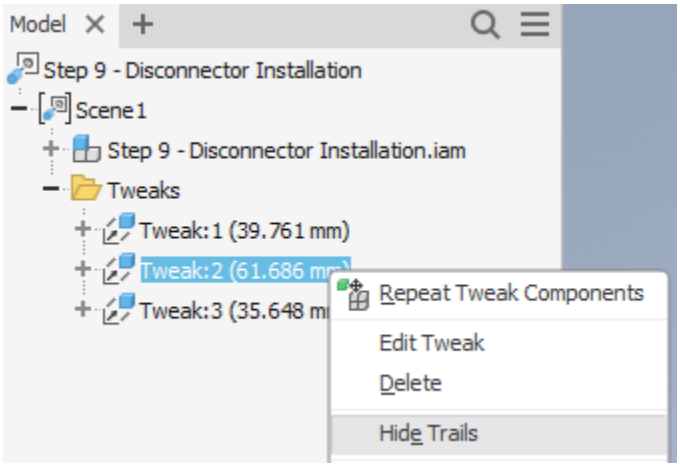
9. Select the object you want to depict being assembled. Click the Tweak Components button up top. Use the arrows to adjust it accordingly, and then click the green checkmark to finalize the change. Again, remember that at this point, what you see is what you get.



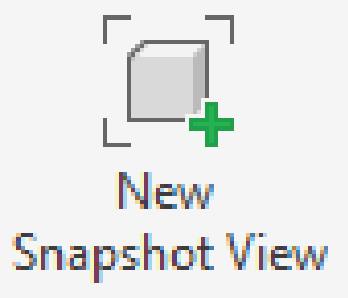


Repeat this process for all of the components you intend to depict the assembly of.

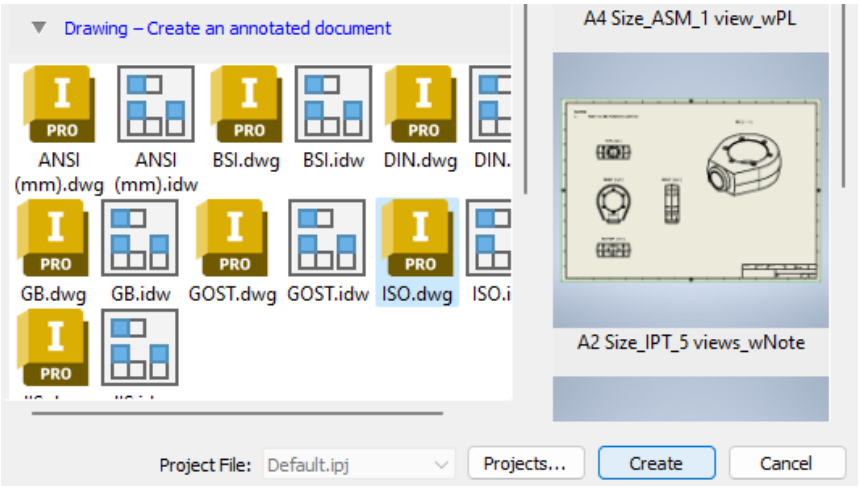
10. If you do not like the way an automatically generated trail looks, you can hide it and manually sketch it in later. To hide the trail, in the window on the left, open the Tweaks directory, find the tweak with the undesired trail, right-click it, and then click Hide Trails.



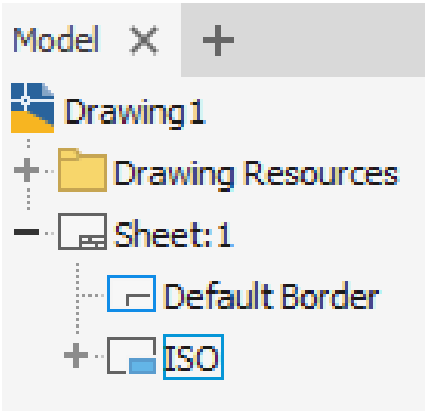
11. When you are finished arranging the presentation file, click the New Snapshot view button up top. Do not forget this step. (It is easy to absentmindedly forget, and it is inconvenient to rectify.) When you are done, save your work. I would recommend giving it the same name as the assembly file you are building it off of, which it should default to. (Step # - …)



12. Go to File → New or press CTRL+N. Select one of the drawing templates. I use “ISO.dwg”, but the exact one you choose does not matter. Click Create.



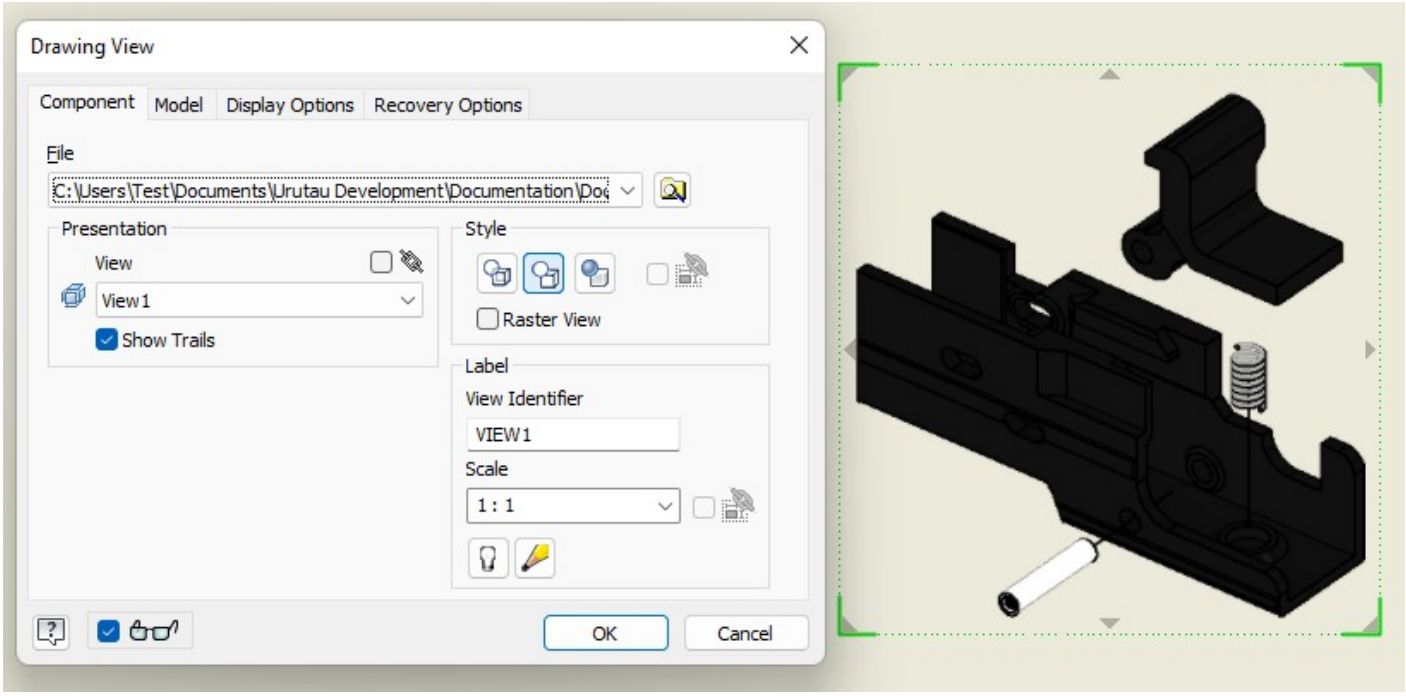
13. You will see a blank off-white page with a border around it and some standard text fields in the bottom-right corner. In the menu on the left, delete the “Default Border” and “ISO” items. (They may be named differently if you chose a different template.) This should give you a completely blank page to work with.

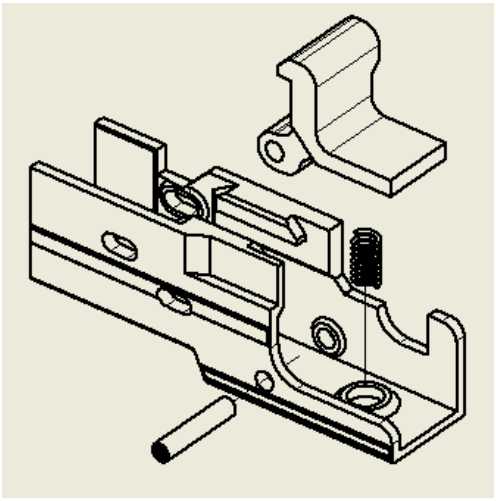


14. In the top-left corner, click the Base button. At this point, I recommend experimenting with the options to get a feel for what they do. For the purposes of my example, I do not need to depict the inside of any of the objects, so I will keep the Hidden Lines Removed Style selected. Under the Display Options tab, I am going to select the Tangent Edges checkbox to better depict a 3D image on a 2D page.

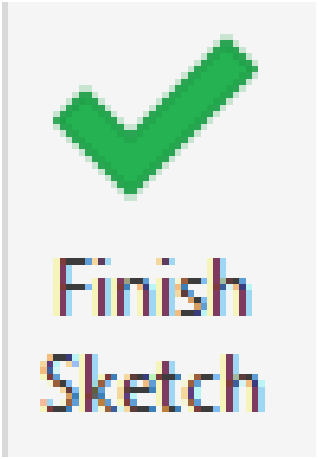
    Back under the Component tab, you will want to customize your Scale setting. Although this appears to be a dropdown menu, you can manually key in a ratio for extra control, if you so choose. The scale setting effectively controls what your line weight will be after the completion of the next step. If you don't get it right at first, don't worry. It is easy to change, and with practice, you will get a better feel for what scale to choose. Step 17 will help you determine if you need to make changes.

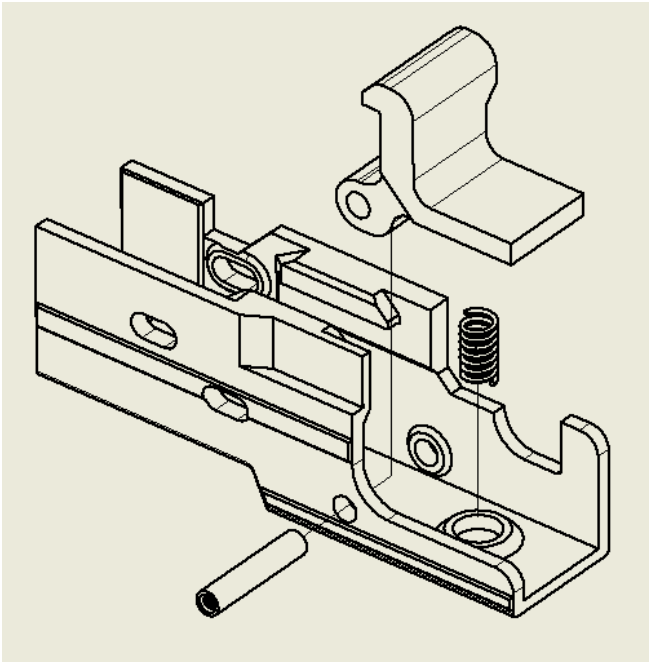
    Click OK when you think you are finished.



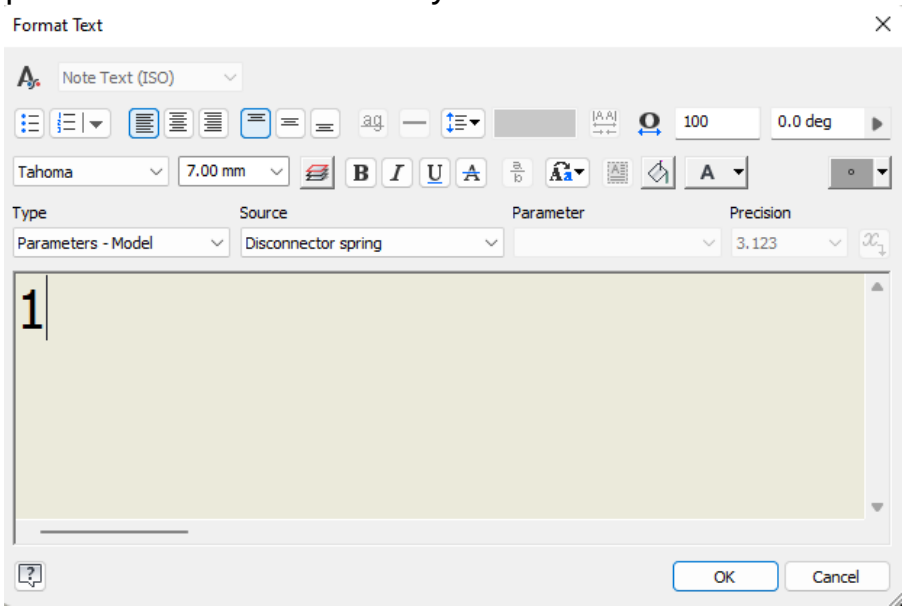


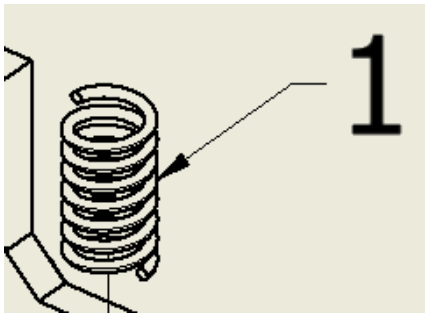
15. If you need to manually draw in any trails to replace the one(s) you hid earlier, click on the Sketch tab up top, and then click the Line button. Draw in the trail(s) as you see fit. When you are done, click the Finish Sketch button.





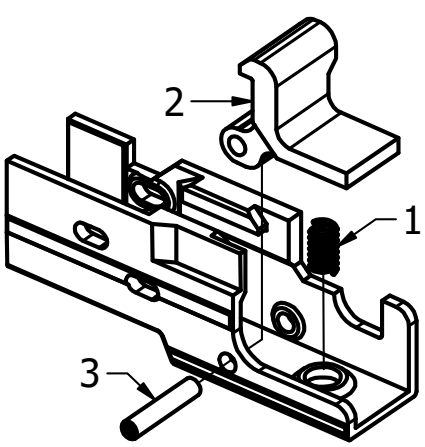
16. If you need to add annotations to your graphic, under the Annotate tab, click the Leader Text button. Click the spot on the image you want the tip of the arrow to go, and then click the spot you want the tail-end of the arrow to end. Do a right-click, and then click Continue. Type your annotation and change the text formatting to your preference. Click OK when you are finished.



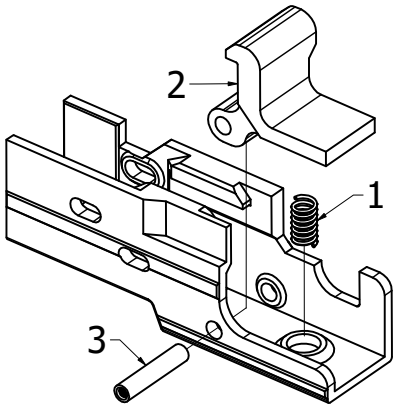


Repeat this process for as many annotations as you need.

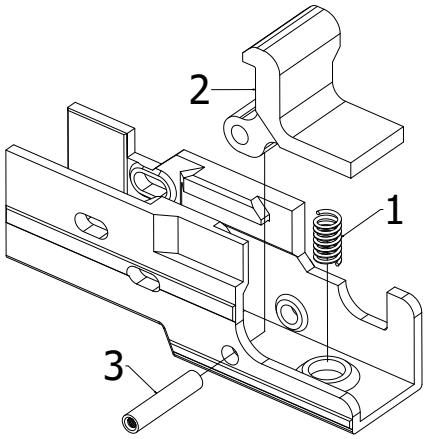
17. Don't forget to save your work! I recommend giving it the same name as the presentation file and base assembly. Go to File → Export → PDF. The file name should default to your drawing file name. Click Save. Open the newly created PDF and look carefully at the line weight. If the lines appear too thick or heavy, it is because, in step 14, you set the scale too low. If the lines appear too thin or light, you set the scale too high. If you need to change the scale, do so and then repeat this step. (Note that the font sizes of annotations will not adjust automatically when changing the scale.)



TOO HEAVY



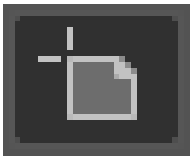
GOOD



TOO LIGHT

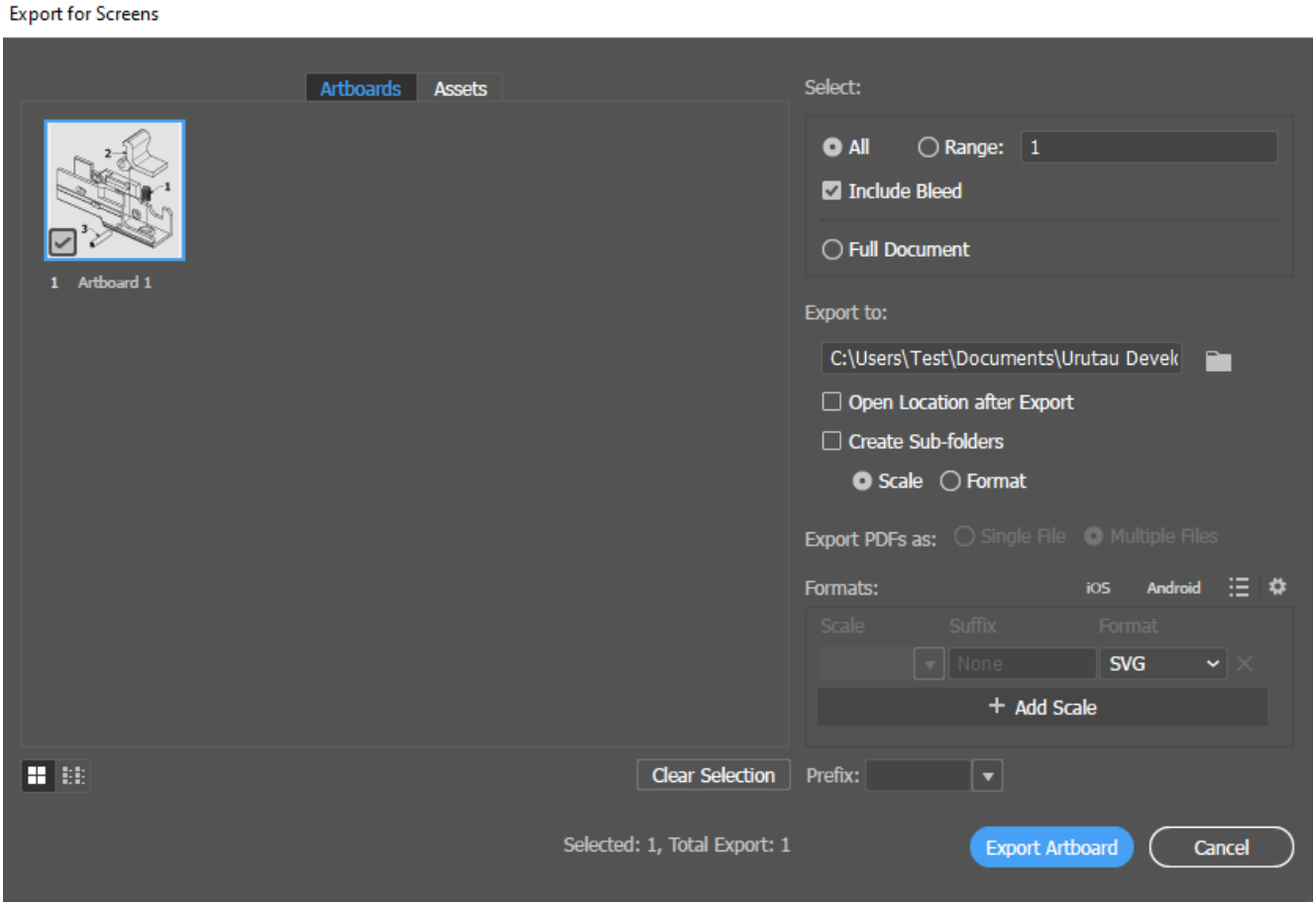
This graphic may appear similar to the good example, depending on the software you are using to view this PDF.

18. In File Explorer, right-click on the PDF file and open it with Adobe Illustrator. (You may be able to substitute Illustrator with Inkscape, but these instructions will cover how to utilize Illustrator.) Open the artboard tool or press Shift+O. Crop the image to remove unnecessary white space.

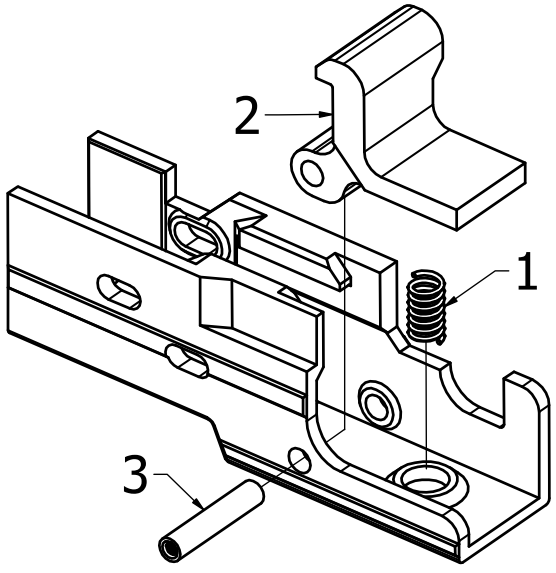


Press the Escape key when you are finished. Optionally, if you know how to use Illustrator, add or change anything else that you see fit. Save the PDF.

19. Go to File → Export → Export for Screens or press CTRL+ALT+E. Make sure the export location is correct, and make sure the format is set to SVG in the Formats section. Click Export Artboard. This will save an SVG file to your directory titled “Artboard 1”. In File Explorer, you will need to rename it. I recommend giving it the same name as your PDF.



20. Congratulations! Your graphic is complete. From here, you may add it to your documentation.



21. We are not done yet, though! I imagine that if you are writing documentation, you are going to need more than one graphic. For the next step of your documentation, open the assembly file that you created in step 4. Go to File → Save As, and title it with the same nomenclature you were using, like “Step (# of next step) - (quick description of next step)”.
22. After you saved the assembly file, turn the visibility back on for the parts that you will need to depict in the next step. This is practically the same thing you did in step 5, except you are making parts visible this time.
23. Continue the process from step 6 onward for all the graphics that you need. Note that if a graphic does not need to depict the assembly of something, you can skip steps 6 through 11 and depict the assembly file in the drawing file instead. (An example of a graphic that does not depict an assembly process would be the image on the cover page of the Urutau documentation.)

In conclusion, authoring and illustrating documentation is challenging and tedious. There is no other way to put it. However, with practice, you will get the hang of it. For whatever project it is that you are working on, I hope you found this guide insightful.

-RSmith28